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Answer to Questions From Utah DEQ's Julie Silotti on the West Valley Site

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From the of questions posed, we assume you are interested only in the commercial State-licensed Disposal Area (SDA) at West Valley, and not the Fuel reprocessing operations, HLW vitrification operation, or NRC-licensed Disposal Area (NDA) which supported the reprocessing operation.

1. **Age of site**: The SDA Operated from 1963 to1975.

2. **Construction/Structures of site**: The site is approximately 16 acres in size and sits on a small elevated rise bordered on the north and east by small, highly variable streams. There are relatively steep slopes from the level of the disposal area down to the stream beds.

   The burial area itself consists of 14 shallow land disposal trenches in two parallel sets of 7. Twelve trenches were simple open trenches excavated by heavy equipment and back-filled as they were filled. They were from 450 to 650 feet in length, 20 feet deep, and tapered from 35 feet in width at the top to 20 feet in width at the bottom. Each of these trenches has at least one sump located at the lowest point, which is accessible from the surface via a vertical metal pipe. The other two trenches were for special use. One consisted of a small open trench that had concrete poured on the floor, large containers of high activity waste were placed on the resulting slab, and additional concrete was poured over them to encase the waste. The other was actually a series of bore-holes which waste was placed into and back-filled with soil. Neither of these trenches has a sump. The cover soil was originally compacted with a roller. In the late 70's and early 80's additional soil was placed on top of each trench, shaped to promote runoff and compacted in an attempt to control surface water infiltration.

   In addition to the trenches, three shallow retention ponds were utilized during the operational phase of this site. Precipitation that accumulated in the open trenches was pumped to the ponds for analysis and treatment if necessary. There are currently three structures on the site. On is a containment structure for a storage tank which contains leachate pumped from some of the trenches during the time period when leachate levels were rising. A second contains

two empty backup portable “frac tanks” in case additional leachate pumping ever became necessary. The third structure is a work trailer used during installation of the remedial measures (see 5 below).

3. **Rainfall/ground water levels**: Average rainfall in the West Valley area is 41 inches per year. The groundwater at the SDA is variable and generally shallow. There is a thin mobile layer within the upper weathered till soil layer, which is only weakly connected to the water in the underlying unweathered clay till.

4. **Soil Composition**: The soil is a high clay content glacial till, with some sporadic unconnected permeable lateral lenses containing poorly graded clay, sands, and silts. Water movement through the competent till is extremely slow, with the exception of the upper weathered till exposed to freeze/thaw, dessication cracking, and oxidation.

5. **How the leak was contained**: First, let me describe the cause of the “leak”. It was the result of what is generally referred to as the “bathtub affect”. Due to the extremely low permeability of the native clay till, any water that makes its way into the trenches accumulates within the confines of the original excavation. Infiltration was primarily due the fact that the top few feet of clay till is weathered, tends to dry out, contract and crack when exposed to the atmosphere, making it possible for precipitation to find its way into the trenches. This water (leachate) continued to accumulate until the level in trenches 4 and 5 reached that of the lower weathered till horizon. It then began to migrate horizontally to the north at trench 4 towards the side of the stream gully commonly referred to as the north slope, and to a lesser extent to the west along the edge of trench 5. It was identified in March of 1975 as seepage areas on the north slope and along the western edge of trench 5.

   The methods of eliminating the “bathtub effect” induced leak were focused first on reduction of the leachate level in the affected trenches by pumping, and secondly on stopping water infiltration into the trenches. Leachate levels were reduced first by pumping form the problem trenches to ones with less leachate accumulation, and later to a storage tank. Infiltration control included placement of an up-gradient slurry wall along the side of trench 14 where one of the lenses of more permeable soil intersected the side of the trench. Additionally, all of the trenches are now covered with an exposed geomembrane cover that channels runoff to detention basins to control discharge rates into the surrounding streams. The combination of the slurry wall and cover have been highly successful in controlling infiltration. Leachate levels in all trenches are either level or declining very slowly.

6. **Any damage done to the environment or populations:** The only currently existing environmental impact is a very small area

of groundwater contamination immediately adjacent to the northern trenches. The radionuclide concentration is dropping at the decay rate, indicating no ongoing discharge.

Due to the rapid response to the detection of the leachate seepage, little activity is believed to have made it into the adjacent stream. The stream itself, and the larger ones it feeds, are not utilized as drinking water sources. Thus, there is no significant impact to the surrounding population from this leak.

7. **Waste types that were accepted:** since this site pre-dates NRC's Part 61 classification scheme and disposal requirements for LLRW, a very broad cross-section of wastes were disposed of here. This includes the usual LLRW wastes streams from industrial, medical, and research facilities from that era, some wastes now considered to be GTCC, as well as Uranium, Radium, Naturally Occurring Radioactive Material (NORM), low activity Transuranic wastes, various sealed sources, debris from D&D of commercial and defense related sites, some wastes produced as a result of the spent fuel reprocessing activities on the site, even a SNAP reactor, a form of a Radioisotopic Thermoelectric Generator for powering satellites, containing plutonium enriched with Pu-238. The latest characterization study estimates that over 2.3 million cubic feet of wastes were disposed of in the trenches for a total of 129,615 Ci of activity.